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ABSTRACT

This study assessed the efficiency of the current science radio programs in Uganda, determined whether there exists any significant difference in performance of students who receive radio lessons in science and those who do not, and assessed problems associated with the utilization of the science radio programs in primary classes. Data were collected from students (N=160) and teachers (N=8) using a teacher questionnaire and student achievement test. (These instruments are provided in appendices.) Findings indicate that using the radio program is an effective strategy for teaching science and that the programs are effective in helping students learn the desired concepts and values. However, the majority of the teachers did not prepare lesson plans for the radio lessons or prepare their students for the radio lessons. Therefore, the programs were not efficiently utilized because few students could follow them without the help of the teacher. These and other findings suggest a need for sound teacher training in the use of the radio programs and the provision of classroom support materials. (JN)

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African Studies in Curriculum Development & Evaluation

General Editors: *Peter Bachsenmeier*
Kofi B. Quansah

No. 86

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EFFECTIVENESS OF RADIO PROGRAMME IN SCIENCE TEACHING IN UGANDA.

ACE Project

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This research project was undertaken as part of a training programme jointly organised on behalf of the African Curriculum Organisation (ACO) by the Kenya Institute of Education (KIE), the University of Nairobi, and the German Agency for Technical Cooperation (GTZ).

THE EFFECTIVENESS OF RADIO PROGRAMMES AS A STRATEGY FOR TEACHING SCIENCE IN PRIMARY SCHOOLS IN UGANDA.

BY

WALUGEMBE RICHARD

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CHAPTER I

STATEMENT OF THE PROBLEM

1.1 BACKGROUND.

The Ministry of Education in Uganda embarked on radio broadcasting for schools in 1961, and started educational television in 1964. Both programmes, were originally and up to now part of Radio Uganda which is under the Ministry of Information and Broadcasting. In 1974, the Education radio (ER) unit and the Education Television unit were merged into Educational Radio and Television (ERTV) Section. The section is headed by the senior inspector of schools.

The primary purpose of the ERTV was to supplement classroom teaching in secondary schools, and to provide core teaching materials at least in areas of the syllabus where a shortage of specialist teachers or adequately trained staff existed in teachers' colleges and primary schools. Radio programmes in 1973 numbered 144 for primary schools, 120 for secondary schools and 144 for teachers, parents and others.

Currently, the Educational radio is alloted twenty slots of either fifteen or twenty minutes air-time each week, between Tuesday and Friday from 10:30 a.m. to 12:00 noon, during a Broadcasting term of six weeks. There are three such terms a year. This is clearly shown on the Broadcast to schools timetable as attached (Appendix I).

Subjects covered for primary level programmes are:

Science
Maths
General and Moral Education.
English and Music.

The writing of scripts is done by a few established radio producers assisted by teachers/writers recruited from schools or colleges.

1.2 AREA OF RESEARCH.

Kampala district is of the most densely populated district in Buganda province. Although, predominantly in-habited by the Baganda community, there are other ethnic groups in the district, since its chief-town, Kampala is the capital city of Uganda.

There are 64 primary schools, and 1100 teachers in Kampala. Of this number of teachers 126 are untrained (Education statistics 1980).

1.3 THE LITERATURE.

Despite all the effort to produce radio programmes for primary schools in particular, the government of the Ministry of Education has not carried out any comprehensive evaluation of these programes. However, this may be too pessimistic as general observation, but a questionnaire survey in 1972 estimated that the take-up of radio programmes was 40% of the potential primary school audience and 1% of the potential secondary and T.T.C. audience. So no research on the effectiveness of Radio programmes in teaching science to primary school pupils in Uganda has been undertaken.

Research on the effectiveness of Radio programmes done in a few African countries like Kenya by the Educational media services, has covered all programmes and have not been limited to a particular subject such as science. Such studies have tended to be national in scope covering all schools in that particular country.

On the other hand, some studies undertaken outside Africa have come out with solid results that could be used as the basis for investigations about the Africa situation. In Britain, investigations have shown that radio instruction in Music is commonly more effective than conventional classes (Wall, 1976).

In the USA educational radio in spite of the constraints, had its successes. Some Universities, in the Midwest, most notably Wisconsin, promoted quite extensive local networks, and some large cities like Chicago and New York developed radio stations which provided full schools' service.

Schramm (1967) summarized the Tailand experience and reported on a 1957 evaluation by the Thai Ministry of Education. The evaluation showed students whom received the radio lessons in Music and social studies, to be significantly superior along several dimensions to students who did not.

In 1967 Chu and Schramm concluded that radio, when appropriately supplemented by visual materials can teach effectely for many purposes. Hence, for a radio lesson to be effective, the pupils must be reached they must understand and consequently act as needed by the radio teacher. Also the class teachers must be prepared to assist the radio teacher, to make radio lessons effective. They should be creative and resourceful so as to provided the necessary materials.

To sum up, W. Schramm (1973), cunsultant to and evaluator of many educational broadcasting projects in the developing world, summarises the research studies up to date and concludes that a student can learn from any medium. He goes further and says that effective learning does not depend on how the medium is used but not on what medium is used.

1.4 THE PROBLEM.

The problem of the study is to evaluate or determine the effectiveness of radio programmes in teaching primary science.

The effectiveness of a programme can be looked at as the extent to which the desired information transmitted is received and the message assimilated by the audience. So to determine the effectiveness of a radio programme, the subject matter, support materials and associated problems have to be considered.

The radio teacher's main aim is therefore, to be effective so that his audience would achieve the ultimate understanding of his programmes. Such effectiveness can be assessed on the basis of an audience being reached. It also involves the teacher's understanding of pupils' psychology.

Like an ordinary classroom lesson, the radio lesson has certain objectives to achieve. Unless these objectives are achieved the radio lesson is rendered ineffective. To make radio lessons effective the class teacher must be prepared to work with the radio teacher. As in any other instructional medium the class teacher has some stages to go through to/be to render the radio lessons a success. These stages could/formulated as:

1. Teacher Preparation.

Educational Broadcasts are not meant to replace or take over from the classroom teacher at all, so these broadcasts should be treated as supplementary teaching aids (A.L. Achungo 1978). This means that the class teacher should prepare the lesson well in advance according to Broadcast to school notes. Instructional aids required must be brought to class before the broadcast lessons. The radio should be in perfect

working condition. The class teacher should familiarise himself with the broadcast content.

2. Preparation of the Environment.

The teacher should see to it that there's minimum disturbances from within and without the classroom. The radio set shoud be located on a table at the centre so that all can hear and see without strain. Thus the environment should be such that proper reception is achieved.

3. Class Preparation.

Pupils should be prepared thoroughly for a radio lesson as for any class activity. They should be motivated by telling them the importance of the broadcast. This attracts their attention.

4. Use of Support Materials.

The learners should be encouraged to participate where the radio teacher requests them to. The support materials should be used clearly and effectively by the teacher.

5. Follow-Up.

Each pupil should be given a chance to react to what he/she has heard. If possible the pupils should be allowed to perform the experiment again. With proper follow-up the degree of retention is increased.

In conclusion, although stages (3) and (5) are usually carried out by the class teacher, stages (1), (2) and (4) are often overlooked. Teachers have the tendency to take the radio lesson time as time to smoke a cigaratte or chart with their colleagues. The pupils are left on their own with the radio set infront of them. Eventually, in stage 5, the follow-up, if at all carried out, the main objectives are not clearly brought out. This, too, kills the pupils' interest in the radio lessons and renders the radio teacher a failure. The class teacher has to systematically follow the radio lessons in order to make these radio programmes effective.

1.5 PURPOSE OF THE STUDY.

Presently, the information concerning the reaction of the listening audience to programmes is unadquate. The teachers need to react to the Educational Radio Programmes so as to let the producer informed of his audience.

Even in places where reception is good, it is not certain whether the performance of pupils who receive radio lessons in science is different from that of those who do not.

Therefore, it is the purpose of this study to:

(a) Assess the efficiency of the current science radio programmes

(b) Find out whether there exists any significant difference in performance of pupils who receive radio lessons in science and those who do not.

(c) Assess the problems associated with science radio programmes in terms of utilization.

It is true that radio is quite inexpensive when it is used for large audiences (Malakul and Schramm 1967). Hence, the study lays a starting point for the broadcast services to launch a national project to demonstrate how school programmes on radio could be used effectively.

Also, since no systematic national evaluation has been carried out on these radio programmes the results of study could serve as an incentive for a formal evaluation.

1.6 LIMITATIONS OF THE STUDY.

(a) Financial limitations restrict the scope of the areas to be covered and the ultimate total sample. The size of the data collected was restricted in that the materials for preparing questionnaires and tests were very expensive especially then when the Uganda shilling was floating.

(b) Time allocated to the research project was not quite sufficient for data collection and analysis.

(c) Cooperation of teachers particularly of older and less well-trained ones was poor because of the embarrassment of fearing to lead a class with the radio teacher.

(d) Written literature sources on educational radio relevant to the African situation are very much inadequate.

CHAPTER II

DESIGN OF THE STUDY

2.1 Sampling Procedures.

Science is taught in all primary schools in all classes in Kampala district. But due to practical constraints the evaluation was limited to primary 6 classes only.

All 64 primary schools in Kampala district have primary 6 classes. Out of 64 primary schools about 40 schools have radio sets and do take radio lessons.

The sampling was through random selection of 4 schools out of 40. The subjects handled are shown in table 1.

TABLE I:

No. of subjects in sample selected.

PUPILS	(40 x 4) = 160
TEACHERS	2 x 4 = 8
TOTAL	168

Consequently to avoid extensive travelling because of limited time the sampling of schools for investigation was ~~restricted~~ restricted to schools within 20 km of Kampala City.

With such limited area of operation all schools which took radio lessons at the time of the research within this area were listed. These on the list were followed by those schools which did not take radio lessons. The sample schools were then selected using the table of Random Number.

2.2 Research Instruments

The study involved the use of two types of instruments:

(i) A questionnaire administered to the class 6 science teachers

(ii) An achievement test for evaluating actual radio lesson in science.

Both instruments are attached as appendix II, and III respectively.

The researcher sought to provide information on the issues listed in the purpose of the study. In construction of the test items, the main issues considered were the contents of the lessons taught, the methodology and the instructional materials used, and the qualification and experience of the class teacher. The attitudes of the learners and maintance of the radio sets have also been considered.

2.3 Administration of the Research Instruments

The first research instrument was administred to class 6 science teachers in schools which take radio lessons only. Becuase of the short time, this questionnaire was administered by the researcher himself to ensure that all teachers received it. The teachers were easily reached and cooperated well.

The second instrument was the achievement test. This one was administered to both the experimental groups, schools which took radio lessons, and the control group, schools which did not take radio lessons. The questions were selected from topics which had been covered by class 6 in both groups. The tests were administered with the assistance of the class 6 teachers in the respective schools and their headmasters.

Both instruments were pre-tested, analysed and charges/recommendations effected before administration.

CHAPTER III:

DATA ANALYSIS.

As already pointed out in chapter 1, the purpose of this study was to:

(a) assess the efficiency of the current science radio programmes

(b) find out whether there exists any significant difference in performance of pupils who receive radio lessons in science and those who do not.

(c) assess the problems associated with science radio programmes in terms of utilization.

3:1 EFFECTIVENESS OF SCIENCE RADIO PROGRAMMES.

The effectiveness of a programme could be looked at as the extent to which the desired information transmitted is received - that is the covarage, and the message or content assimilated by the audience. The responses about this item were obtained through a questionnaire administered to class 6 teachers in the experimental groups. Therefore the researcher dealt with this item in the following manner:

3.1.1 Coverage of the science radio programmes.

3.1.2 Content coverage of the science radio programme

3.1.3 Relevance of the content covered by the radio programme to pupils' radio manual

3.1.4 Language level of the radio teacher.

3.1.5 Attention and enjoyment of the radio programme.

3.1.1 Coverage of the science radio programmes.

From the information got from the inspector in charge of ENTV and the Kampala District Education Officer (D.E.O), the extent to which the science radio programmes is received within Kampala district, is summarised in table 2 below.

TABLE 2.

No. of schools	Distance from Radio Uganda.	Radio sets per school	Feedback
20	3 - 8 km	1 or 2	received
15	9 - 10 km	1	"
10	11 - 15 km	1	sometimes
5	16 - 20 km	1	"
14	20 - 25 km	Nil	Never

From the table it is clear that out of the 64 schools in the district 40 schools have at least a radio set, and are capable of receiving the radio programmes.

TABLE 3

CONTENT COVERAGE AND RELEVANCE AND LANGUAGE LEVEL

Responses	Content coverage	Relevance	language level
Yes	62%	80%	52%
No	38%	20%	48%
TOTAL	100	100	100

The table 3 was drawn according to the information given on items 8, 9 and 10 of the questionnaire for the teachers.

3.1.2 Content coverage of the science radio programme.

The 8 teachers tested were of different views on the issue of the content coverage of the science radio programme. 62% agreed that the content coverage was adquate and 38% strongly refused. Some of those who agreed, categorically stated that for a particular lesson the content was not enough because of the time (15 minutes) per lesson, but after a series of lessons on a given topic the content is all covered.

3.1.3 Relevance of the content covered by the radio programme to Pupils' Radio Manual.

Column three of Table 3 indicates that 80% accepted that the content covered in the science radio programme is relevant to primary 6 class or upper primary pupils' Radio Manual.

Therefore, it can be concluded that the content covered by the science radio programme was relevant to primary 6 pupils Radio Manual.

3.1.4 Language level of the Radio teacher.

As shown in forth column of table 3, 52% of teachers investigated accepted that the language used by the radio teacher suited the language level of their pupils in class 6. 48% stated that the language level did not suit them. This is an ambiguous situation. Some teachers pointed it out that the pupils tend to lose trend of the radio lesson because the radio teacher speaks fast.

As a result, the pupils fail to follow and understand the broadcast hence rendering the programme ineffective.

In general, it shows that the content is relevant to the pupils, manual but it is not highly covered. This could be due to the time limitation. But it is possible that the content could not be effectively covered due to the language level of the pupils. This implies that the radio lesson teacher only points emphasis on important points of the items in the contents of the manual.

3.1.5 Attention and enjoyment of the radio programme.

As a teacher your teaching can be said to be effective only where the audience pays attention and enjoys it. Table 4 below reveals the picture of the radio programmes.

TABLE 4:

ATTENTION AND ENJOYMENT OF RADIO PRODGRAMME

	Always	sometimes	Never
Attends	30%	34%	36%
Enjoys	46%	40%	14%

Table 4 was drawn from the information obtained fr. , items 11,12,13 and 14 of the teachers questionnaire. From the table 64% of the respondants accept that their pupils follow the radio programmes, and 86% do agree that pupils quite enjoy these programmes. However, more than half of the teachers were of the opinion that the pupils could not follow the radio lessons without their help. It is therefore clear that teachers should help pupils follow the radio programmes. Without the involvement of teachers only a few pupils would follow the radio teacher.

On analysis, if the content coverage is relevant to the pupils' manual with the relevant experiments covered during radio lessons; language level of the radio teacher easily followed by pupils, mainly with the aid of the classroom teacher; and also the pupils do pay attention and enjoy the lessons, than it can be concluded that the radio programme is effective as a strategy for teaching science.

3.2 PERFORMANCE OF PUPILS WHO RECEIVE RADIO LESSONS IN SCIENCE.

The second objective of the study was to find out whether there exists any significant difference in performance of pupils who receive radio lessons in science and those who do not.

For the purpose of the study, an achievement test was prepared on the topics (work and enegy) covered by the broadcast. Four schools were selected at random, 2 of which were in experimental groups the other 2 formed the control group. The schools both groups were nearly similar to each other; the control schools of course did not listen to the science radio programmes but covered the topics with their classroom teachers only. While the experimental schools covered the same topics with their teachers plus the radio programme supplement. All together 160 pupils from class 6 were examined.

On analysis of the marks obtained by the pupils in both groups; the pupils in the experimental group did significantly better. The mean mark for the experimental schools was 74% while the control schools had a mean mark of 65%. In all, the experimental group was found to be level superior to the control group at a level of 0.001.

We, therefore, conclude that the scienceradio programmes did help the pupils to learn the desired concepts and values.

3.3 UTILIZATION OF RADIO PROGRAMME AND ASSESSMENT OF ASSOCIATED PROBLEMS.

The teaching of science through radio can be said to be effective when the programmes are properly utilized. With the assurance that each primary school was given a radio cassette Recorder last year, we went on to assess how the programme is utilized. We examined the distribution of the support materials and whether they are effectively put to use. The part played by the classroom teachers was looked at.

3.3.1 Support Materials

These include aids like pamphlets, charts, pupils' science manuals, Broadcasts to schools lesson notes, (B.S.N), Broadcasts to schools timetables (B.S.T) and other learning aids.

TABLE 5

THE AVAILABILITY OF B.S.N AND B.S.T

	In time	Late	Not at all
B.S.N.	15%	20%	65%
B.S.T.	60%	33%	7%

Table 5 is drawn from the information obtained by item 15 in the teachers' questionnaire. It is apparent that only 15% of the teachers got the broadcast to schools notes in time to organise efficient work with them. The other 84% either got the notes late or never got them at all. It was concluded that the Broadcast to schools notes are not properly distribued. Consequently the teachers may not confidently and effectively teach as required.

As regards the term broadcast to schools timetable, 93% of the teachers acknowledged receipt. This is quite the opposite of the broadcast to schools notes. It is possible that the notes are scarce because of printing costs.

Item 16 of the same questionnaire reveals that 44% of the respondent schools, received other support materials. Therefore we can take it that support materials are poorly distributed and quite lacking in schools.

3.3.2 Supply of batteries

Item 18 of the teachers' questionnaire dealt with the supply of batteries. Batteries forturately in the area of research are not frequently used. The schools have electricity and all teachers stated it that in cases of power failure they could get the batteries whever they needed them.

3.3.3 The class teacher's part in Programme.

Proper utility of the programme also depends on the part played by the classroom teacher during the programme and after in the follow-up phase. The responses were recorded in items 19, 20 and 21 of the questionnaire.

From these responses it can be concluded that the majority of the teachers do not prepare lesson plans for radio lessons and that do not prepare their pupils for these radio lessons. Therefore the programmes are not efficiently utilized because few pupils can follow without the help of the teacher.

The last but not least phase the follow-up. Item 13 clearly showed that only 25% of the teachers did the follow-up. This shows that the five stages formulated in chapter 1 are not generally adhered to by the classroom teachers, as a result programme utilization is low.

CHAPTER IV

SUMMARY:

Education Radio is one of the resources which contribute to the General Education both formaland non-formal.

The overall objective of the media is to supplement the existing educational system to upgrade the quality of the material provided to the students and to present material which would be difficult to present in any other way.

Since the inception of the Educational Mass Media in Uganda in 1961, very little attention has been paid to the need of training educational broadcasters and there is no clear policy of training students in Teacher Training Colleges in the use of Educational broadcasts. This lack of trained staff has greatly contributed to a continuing deterioration of ERTV service over the last 15 years.

Consequently, with the present situation many areas need to be explored for better use of radio into our school system. This prompted this research on the effectiveness of the use of radio programmes as a strategy for teaching science, with a hope that the results will be useful not only to primary school science teachers, but also to programme administrators.

CONCLUSION:

It must be noted that most of the findings in the research, have come from short-term studies because of the problems of conducting long-term studies - change of teachers and funds just to mention a few.

(a) The part of the classroom teacher

As a general observation, the classroom teacher seems to live the burden of teaching to the radio teacher. The classroom teacher should create an atmosphere for learning that helps pupils to utilize the radio lesson effectively. The five stages/steps should be followed by the classroom teacher if the product of the radio teacher has to be used effeciently.

In general, it was felt that the broadcasts do relieve the monotony of the classroom and force teachers to be more creative by making better use of teaching aids. This is clearly shown by the pupils' performance in experimental schools.

So in this respect, for maximum utilization of the radio programme both teachers should receive sufficient training. The radio teacher should be trained to produce meaningful programmes. The radio teacher should be in position to know what he wants the pupils to be able to do at the end of learning a concept. There should be interaction between the classroom teacher and the radio teacher and the children.

Similarly the classroom teacher also, should be given sound training on the use of radio broadcasts. Unfortunately, providing detailed notes, visuals, pamphlets and sending out advance information about programmes does not ensure that teachers will use them. The trouble often lies with our teacher training colleges, where little or no instructions is given, in the use of mass media.

With this sound training, the classroom teachers are able to pre-study the lesson materials, and eventually participate in the radio teacher's activities/experiments properly. Consequently the follow-up stage is automatically carried out.

(b) Support materials

For a proper science lesson support materials are very important and quite necessary. Apart from the Broadcast to schools notes sent to schools once a year and the termly timetables, other support materials or visual aids should be provided to the classroom teachers. These make the lessons real, interesting and enjoyable.

Lastly, as far as the teaching of science is concerned, the radio programmes should pay special attention to pupils' activities/experiments during the lesson. Pupils should be encouraged to solve problems during the lesson and they should be given time to do this. The series of radio programmes should be sandwiched with projects to be accomplished. Active involvement of the student aids his understanding and memory. Remember:

If I hear, I forget,
If I see, I remember,
If I do, I know.

This means radio teacher should dwell on the techniques and stimulate the pupils to carry out the designed projects.

APPENDIX I

RADIO LESSONS

GENERAL TIME-TABLE - 2ND TERM, 1983.

TUESDAYS

10.30 a.m.	Teaching and Learning	- for T.T.C's.
10.45 a.m.	Music	- for Sec. Schools.
11.00 a.m.	Science	- for Upper Pr. Classes.
11.15 a.m.	English for Lower Pr.	- for P.3. pupils.
11.30 a.m.	Listening for Pleasure	- for Primary Schools.
11.45 a.m.	General Education-	- for all grades.

WEDNESDAYS

10.30 a.m.	Moral Education	- for all grades.
10.45 a.m.	Literature in Luganda	- for O'level students.
11.00 a.m.	Teaching Eng. in Pr. Schs.	for T.T.C's
11.15 a.m.	French	- for Sec. Schools.
11.30 a.m.	Science & Technology	- for Tech. Institutes.
11.45 a.m.	Health Education	- for Upper Pr. classes.

THURSDAYS

11.30 a.m.	Literature in English	- for O'level stulents.
10.45 a.m.	Science	- for Upper Pr.classes.
11.00 a.m.	Eng. for Lower Pr. classes	for P.3 pupils.
11.15 a.m.	Foundations of Education.	- for T.T.C's.
11.30 a.m.	Music	- for Sec. Schools.
11.45 a.m.	General Education	- for all grades.

FRIDAYS

10.30 a.m.	Foundations of Education	- for T.T.C'S.
10.45 a.m.	Literature in Luganda	- for O'level students.
11.00 a.m.	E. A. Natural History	- for Upper Pr.classes.
11.15 a.m.	French	- for Sec. Schools.
11.30 a.m.	Teaching & Learning	- for T.T.C's.
11.45 a.m.	Current Affairs.	- for all grades.

PLEASE NOTE: All broadcasts for 2nd Term 1983, will begin on Tuesday, 17th May, 1983, extend over a period of eight weeks and end on Friday 8th July, 1983.

AN EVALUATION OF THE EFFECTIVENESS OF RADIO PROGRAMMES IN TEACHING SCIENCE:

QUESTIONNAIRE FOR TEACHERS:

This questionnaire is to be completed by the class 6 science teachers, those who are dealing with Radio lessons only.
You are invited to complete this questionnaire, and in doing so make every effort to answer honestly and responsibly. Your comments and answers will be analysed and results passed on to the Ministry of Education for better radio programme in future.

A. GENERAL INFORMATION:

1. Name of the school .....
2. Sex (put a tick) male ( ) female ( )
3. Experience in teaching.....years.
4. Grade of the teacher .....
5. Untrained Teacher (tick) ( )
6. Number of pupils in your classroom .....
7. Write yes or No against the following questions about your classroom.
   (a) Is your classroom large enough to seat all the pupils ? .....
   (b) Do you have enough desks in your classroom for all your pupils? .....

B. CONTENT OF THE SUBJECT:

(Answer Yes or No)

8. Do you receive the pupils Radio Manual?.....
9. Does the radio teacher cover the content of the lesson fully according to the pupils' Radio Manual ? .....
10. Is the language used by radio teacher in the science within the scope of a class 6 pupils ? .....

C. CLASS ATTENTION:

Answer by putting a tick in the box.

		Always	Sometimes	Never
11.	Do pupils follow radio teacher's instructions without your aid ?		23	

		Always	Sometimes	Never
12.	Do they enjoy radio lessons in science ?			
13.	In your follow - up stage, do pupils ask any questions ?			
14.	Do pupils pay attention fully to t to the broadcast up to the end?			

Briefly, discuss what you think is likely to interfere with the pupils' attention. .....

.....

D. SUPPORT MATERIALS:

Answer by ticking the correct choice.

15. Do you get Broadcasts to schools lesson notes and term Broadcasts to schools time table ?

(a) in time

(b) late

(c) not at all

16. What other support materials do you receive for the science radio lessons from the Ministry ? .....

.....

.....

17. How often do you get them ?

(a) regularly

(b) rarely

(c) never

18. How often do you get batteries:-

(a) Whenever we need them

(b) rarely

(c) never

...../3.

CLASS TEACHER'S PART IN THE PROGRAMME

19. How often do you prepare your lesson ?

(a) very often
(b) so often
(c) rarely

20. Do you always prepare the pupils for the radio lessons ?

(a) very often
(b) sometimes
(c) never

21. Do you work and encourage pupils during the broadcasts ?

(a) Very much
(b) not very much
(c) never

TEACHERS' SUGGESTIONS:

For future better productions of the science radio lessons, please briefly suggest ways of improving on these programmes.

APPENDIX III

Name..... School.....

Instructions: Answer ALL the questions in Section A by circling the letter of your best choice.

SECTION A:

1. What does man use to do work?
   (a) legs (b) muscles (c) hands (d) energy

2. Give two things that can do work without use of muscles:
   (a) air (b) moving water and air (c) water
   (d) moving water and wind.

3. A stationary object possesses
   (a) energy (b) stored energy (c) mass (d) weight

4. A moving car gets its energy from:
   (a) tyres (b) petrol (c) water (d) engine

5. Man gets energy to do work from
   (a) water (b) food (c) muscles (d) sweat

6. Do you need energy when you are sitting down?
   (a) yes (b) no (c) sometimes (d) not at all

7. In pumping the blood all over the body the heart needs
   (a) work (b) food (c) energy (d) water

8. The energy in food is measured in
   (a) calories (b) watts (c) volts (d) meters

9. Wind provides us with energy and.....
   (a) heat (b) work (c) water (d) nothing

10. Not all the energy provided by food is used to do work but some is lost as.....
    (a) water vapour (b) sweat (c) heat (d) carbondioxide

11. ..... is the main source of energy?
    (a) moon (b) sun (c) water (d) wind

12. The unrefined oil is called
    (a) oil (b) crude oil (c) petroleum (d) undiluted oil

13. Water can be changed into vapour, if:
    (a) energy is supplied (b) work is supplied
    (c) sun shines (d) the wind blows.

14. Do plants need energy?
(a) yes (b) sometimes (c) no (d) none of these

15. Plants need light for:
(a) photosynthesis (b) chlorophyll (c) cytoplasm
(d) none of these

16. Clouds are made of:
(a) smoke (b) gases (c) water drops (d) none of these

17. Which one of these is not fuel?
(a) wood (b) coal (c) oil (d) water

18. From sunlight we obtain:
(a) light and heat energies (b) light and sound energies
(c) light energy (d) sound energy.

19. In man digestion starts in
(a) mouth (b) throat (c) abdomen (d) intestines

20. Who needs more energy?
(a) a secretary (b) a student (c) a peasant (d) none of these

SECTION B:

Complete these following with a suitable words:

21. Energy is_____to do work.

22. Electricity at Owen Falls Dam is produced by_____

23. Wind mills uses_____to do work

24. Stationary objects posses stored energy which depends on_____ above the ground.

25. In lifting the hand uses the muscle called_____

26. In order to have alot of energy man must eat_____

27. Give two examples of energy giving food._____
_____

28. Work is measure in_____

29. A burning candle uses_____to give_____and
_____energies.

30. Energy can be be_____from one form to another.